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(पहला पुनरीक्षण)

Indian Standard

**PREVENTIVE MAINTENANCE OF AGRICULTURAL
WHEELED TRACTORS — CODE OF PRACTICE**
(*First Revision*)

ICS 65.060.10

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BUREAU OF INDIAN STANDARDS
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Price Group 4

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Agricultural Tractors and Power Tillers Sectional Committee had been approved by the Food and Agriculture Division Council.

Agricultural wheeled tractor is now well recognized as farmer's asset due to its suitability for performing a large number of farming operations conveniently and economically. In order to get maximum benefit out of tractor, proper periodical maintenance is of utmost importance. This Code is intended to help the users in proper upkeep and maintenance of the tractor to get maximum benefit with low cost of operation.

This standard was first published in 1972. Based on the experience gained in the use of this standard by the Central Farm Machinery Training & Testing Institute, Budni, a need was felt to revise it. This revision includes the following changes/additions:

- a) Provision of checking reflector in the rear of tractor; and
- b) Provision of checking tail light of tractor and trailer while travelling on road during night.

Indian Standard

PREVENTIVE MAINTENANCE OF AGRICULTURAL WHEELED TRACTORS — CODE OF PRACTICE (*First Revision*)

1 SCOPE

This standard covers detailed procedure for preventive maintenance of agricultural wheeled tractor.

2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
6283	Tractors and machinery for agriculture and forestry, powered lawn and garden equipment symbols for operator controls and other displays
(Part 1) : 2006/ ISO 3767-1 : 1991	Common symbols (<i>second revision</i>)
(Part 2):2007/ ISO 3762-2 : 1991	Symbols for agricultural tractors and machinery (<i>first revision</i>)
6847:1995	Code of practice for installation of agricultural wheeled tractor (<i>first revision</i>)

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 Agricultural Tractor — A self-propelled vehicle having wheels or tracks, designed primarily to operate trailed or mounted agricultural implements and machines, including trailers, and to supply power to operate them with the vehicle itself in motion or remaining stationary.

3.2 Agricultural Wheeled Tractor — An agricultural tractor in which wheels are the driving members.

3.3 Preventive Maintenance — Systematic series of inspections and operations performed periodically to

maintain or improve the efficiency and performance of the tractor.

4 INSTALLATION

The user should ascertain that the tractor has been installed in accordance with IS 6847.

5 CLEANING

5.1 The tractor should be cleaned thoroughly and regularly.

5.1.1 The spilt fuel and oil should be wiped off.

5.1.2 The accumulated dirt and mud should be removed by pressure of water or air, taking care that the vital parts are properly covered to prevent ingress of water under pressure.

6 LUBRICATION

6.0 Lubrication of different assemblies reduces friction between the moving parts, assists in cooling the engine, seals gases within the combustion chamber and helps in keeping the inner assemblies clean. It is, therefore, essential to lubricate the tractor periodically.

6.1 The lubrication schedule for different assemblies as specified by the manufacturer in the owner's maintenance manual shall be followed. A recommended lubrication schedule is given in Table 1 for guidance.

6.2 The grades of grease and oil as recommended by the manufacturer shall be used.

6.3 Only clean lubricants shall be used.

6.4 The device by means of which lubricant is applied should be clean.

6.5 The quantities of lubricant in different assemblies as specified by the manufacturer shall be maintained.

6.6 All openings through which oil is poured should be thoroughly cleaned and dust covers restored.

7 PERIODICAL MAINTENANCE

7.1 Periodical maintenance should be performed systematically at intervals of 8 to 10, 50 to 60, 100 to

120, 200 to 250, 480 to 500 and 960 to 1 000 engine working hours. The manufacturer's recommendations regarding periodical maintenance shall be followed.

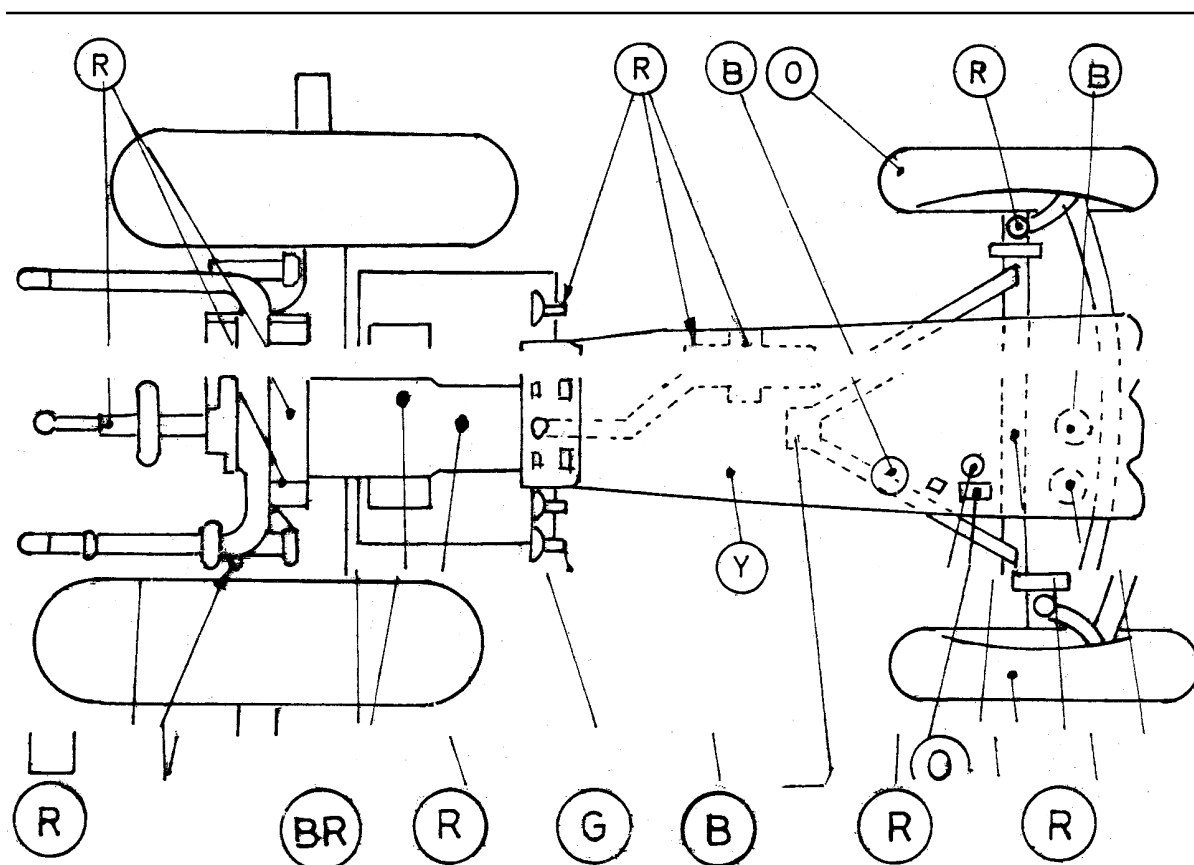
7.2 Different operations which should be performed at different intervals are given in Annex A for guidance.

8 PRECAUTIONS

While performing different operations it is necessary that full precautions should be taken. For guidance, some precautions which should be observed are given in Annex B.

Table 1 Lubrication Schedule

(Clause 6.1)



Sl No.	Interval in Engine Working	Colour Identification	Operations to be Performed	Lubricant
(1)	(2) h	(3)	(4)	(5)
i)	8-10	Red (R)	Change oil in-air cleaner check oil level in water pump bearing and fuel pump	Oil
ii)	50-60	Yellow (Y)	Lubricate hydraulic system, clutch release bearing and steering mechanism	Oil and grease
iii)	100-120	Green (G)	Lubricate front wheel bearing and transmission system	Oil
iv)	200-250	Blue (B)	Change oil in crankcase, fuel pump and governor housing lubricate dynamo, self starter and belt-pulley housing, hydraulic lift joints, brake and clutch pedals and lever joints, power take-off joints	Oil and grease
v)	480-500	Orange (O)	Change oil in front wheel bearing and generator bearing	Oil
vi)	960-1000	Brown (BR)	Change oil in transmission system, steering mechanism, hydraulic system and water pump bearing	Oil

9 GENERAL INSTRUCTIONS

9.1 For Operator

9.1.1 The person driving the tractor should have a valid driving licence from appropriate authority.

9.1.2 The operator should be familiar with all the symbols for different controls as specified in IS 6283 (Parts 1 and 2).

9.1.3 Unnecessary racing of the tractor should be avoided.

9.1.4 The operator should know the operations to be performed before starting, during working and at the time of stopping the tractor.

9.2 For Owner

9.2.1 The owner should keep a log-book for daily record of the working hours of the tractor, the quantities of fuel and oil filled in it and the type and output of work performed by it, All the services performed should also be recorded. A proforma for the log-book and servicing record is given in Annex C.

9.2.2 In case of any trouble, the owner should consult the supplier or his representative for the area.

9.2.3 Implements and machines recommended for that make of the tractor by the manufacturer should be used.

9.2.4 In case the owner himself is operating the tractor, he should also observe the instructions given in 8.

10 STORAGE

While placing the tractor in storage for more than 30 days the instructions given below should be followed:

- a) Store in a dry, well protected place. If under cover storage is not available, use a tarpaulin to cover the tractor.
- b) Wash and clean the tractor thoroughly.
- c) Clean all unpainted parts and where rust prevention is necessary cover with multi purpose grease.
- d) Lubricate the chassis thoroughly, Use rust preventive engine oil in all oil cups and oil holes in place of engine oil.
- e) Drain lubricant from the crankcase while the engine is warm. Flush with crankcase cleaning oil. Refill fresh lubricant of the grade recommended by the manufacturer with 5 to 10 percent rust preventive engine oil. Run the tractor for a period sufficient to splash the lubricant in all parts.
- f) Remove the storage battery from the tractor and store in accordance with manufacturer's recommendation.

- g) Drain the cooling system in the case of liquid-cooled engines.
- h) Place blocks under the axles to take weight of the tyres and to prevent them from touching the ground. If water is filled in tyres, drain the same.
- j) Plug the crankcase breather pipe and exhaust pipe, if covers are not provided.

11 REMOVAL FROM STORAGE

While removing the tractor from storage the following procedure should be followed:

- a) After inflating the tyres, remove the blocks placed under the axles.
- b) Check the electrolyte of the battery. Get the battery charged fully and fit it to the tractor.
- c) Clean the tractor thoroughly.
- d) Remove the plugs from the crankcase breather pipe and exhaust pipe, if placed [see 10 (j)].
- e) Lubricate the chassis.
- f) Check oil level in air cleaner. In case of diesel engine, check oil level in fuel pump also.
- g) Drain the transmission case and final drive and refill with lubricant of the grade recommended by the manufacturer.
- h) Close all drain cocks on the cooling system and refill the system with clean water.
- j) Close drain cocks on the fuel system. Drain sediment bowl. Fill the tank with clean fuel; in case of diesel engine, bleed the air from the fuel system.
- k) Take off the valve cover and flush the valve operating mechanism with engine oil. Press down each valve with a hand tool to make sure that it is operating freely.
- m) Pour or spray small amount of engine oil into each cylinder. Crank up the engine several times, so that the oil may loosen the piston rings and may take out any partially oxidized oil from the valves and pistons.
- n) Drain the crankcase, flush it with flushing oil and refill it with oil of the grade recommended by the manufacturer up to the level prescribed by him.
- p) Start the engine and allow it to run slowly for several minutes in order to get the fresh oil distributed throughout the engine before putting load.

NOTE — Where there is no provision to crank up the engine from front, this could be done by turning the power take-off.

ANNEX A

(Clause 7.2)

PERIODICAL MAINTENANCE

A-1 AT 8 TO 10 ENGINE WORKING HOUR

A-1.1 Clean the tractor and implements.

A-1.2 Check oil level in different assemblies with the tractor on a horizontal surface. Top up, if necessary, when the engine is cold.

A-1.3 Remove sediments from the air pre-cleaner bowl. Clean the oil-bath of the air cleaner, if the tractor operates in dusty and tropical surroundings.

A-1.4 Top up the fuel tank, if necessary, preferably in the evening, after day's work to avoid condensation.

A-1.5 Clean the radiator. Remove dust and dirt accumulated in the core and top up the cooling system, using clean water.

A-1.6 Make sure that the tension of the V-belts driving the dynamo/alternator and the fan is in accordance with the manufacturer's recommendations.

A-1.7 Check the tightness of the fuel, oil and water pipes and hoses, cleaners, fillers and drain plugs to avoid leakage.

A-1.8 Make sure that the inflation of the front and rear tyres is in accordance with the manufacturer's recommendations.

A-1.9 Check the electrical units. Make sure that the ends of the cables are properly connected to the terminals.

A-1.10 Check the level and specific gravity of the electrolyte in the storage battery.

A-1.11 Lubricate the tractor in accordance with manufacturer's recommendations. Lubricate the front wheel hub bearing after puddling operation.

A-1.12 Check all ball joints of the steering linkage. Make sure that the bolts and screws of the front axle, wheel hubs, wheel discs and wheel weights are tight.

A-1.13 Check all the fastening bolts and screws, and make sure that they are tight.

A-1.14 Start the engine and ensure that,

- a) the engine runs smoothly without knocking and abnormal noise;
- b) the oil pressure gauge is registering sufficient pressure;
- c) the warning lights, if provided, are functioning properly;
- d) the dynamo is generating proper current; and
- e) the voltage regulator is functioning properly.

A-1.15 Engage the hydraulic lift and check the movement of the lifting arms and three-point linkage.

A-2 AT 50 TO 60 ENGINE WORKING HOUR

A-2.1 Carry out the operation given in A-1.

A-2.2 Clean the oil filters.

A-2.3 Check the clearance between the clutch thrust bearing and disengaging levers and the movement of the clutch pedal free travel, and adjust, if necessary.

A-2.4 Make sure that the brakes are in good working condition.

A-3 AT 100 TO 120 ENGINE WORKING HOUR

A-3.1 Carry out the operations given in A-2.

A-3.2 Disconnect the cables of the electrical equipment from terminals, apply grease or petroleum jelly to the terminals and reconnect.

A-3.3 Inspect the water pump. Make sure that there are no leaking points.

A-3.4 Lubricate the dynamo putting 8 to 10 drops of light engine oil in each of the oil caps.

A-4 AT 200 TO 250 ENGINE WORKING HOUR

A-4.1 Carry out the operations given in A-3.

A-4.2 Drain oil from oil sump and flush with the flushing oil. Refill with oil of recommended grade and up to the level recommended by the manufacturer.

A-4.3 Lubricate the joints of the throttle control linkage and other ball joints.

A-4.4 Check the clearance of the front wheel hub bearing.

A-4.5 Check the toe-in.

A-5 AT 480 TO 500 ENGINE WORKING HOUR

A-5.1 Carry out the operations given in A-4.

A-5.2 Add rust-removing compound to radiator, start the engine and flush the cooling system.

A-5.3 Interchange the tyres of the front wheels to secure uniform wearing.

A-5.4 Flush the fuel tank.

A-5.5 Test and clean the self-starter, dynamo and switching contacts of the starter relay.

A-5.6 Clean the magnetic drain plug.

A-5.7 Check the injector and adjust, if necessary.

A-6 AT 960 TO 1 000 ENGINE WORKING HOUR

A-6.1 Carry out the operations given in **A-5**.

A-6.2 Change the oil in the gear-box, steering housing, power take-off case and hydraulic system, the grade

and level of the oil being as recommended by the manufacturer.

A-6.3 Inspect the brake lining. Clean and adjust the brakes.

A-6.4 Get the compression pressure of engine checked and get the engine overhauled, if necessary.

ANNEX B

(Clause 8)

PRECAUTIONS

B-1 COOLING SYSTEM

B-1.1 Never run the tractor without water.

B-1.2 Always maintain the level of water as recommended by the manufacturer.

B-1.3 Never fill water/coolant when the engine is hot. Use clean water.

B-1.4 Never remove the radiator cap abruptly when the engine is hot.

B-1.5 Never attempt to lubricate the fan bearing when the engine is running.

B-2 LUBRICATION SYSTEM

B-2.1 Use clean oil of the proper grade.

B-2.2 Use crankcase flushing oil or same grade of lubricant for flushing the crankcase.

B-2.3 Drain the crankcase only when the engine is hot and the oil is well agitated.

B-2.4 Never check the oil level while the engine is running.

B-2.5 Never use cotton waste for cleaning the components.

B-2.6 Metal type oil filter element should be cleaned with bristle brush and any solvents such as petrol and diesel oil.

B-3 AIR CLEANER SYSTEM

B-3.1 Never try to remove the oil cup when the engine is running.

B-3.2 Refill only clean oil of the proper grade.

B-3.3 Never use petrol or other highly volatile fuel for cleaning the filter element. Always clean with a jet of compressed air.

B-3.4 Never use a cracked rubber hose.

B-4 FUEL SYSTEM

B-4.1 Use only clean fuel of proper grade.

B-4.2 Handle the fuel filter very carefully, as the mesh is extremely fine.

B-5 TRANSMISSION AND WHEEL SYSTEM

B-5.1 Avoid riding over the clutch pedal.

B-5.2 Never overload the engine.

B-5.3 Never overlubricate the bearings.

B-5.4 Release the clutch slowly to avoid jerks.

B-5.5 Drain the transmission case only when the engine is warm.

B-5.6 Always keep recommended inflation of the tyres.

B-6 HYDRAULIC SYSTEM

B-6.1 Use only clean hydraulic fluid of the proper grade.

B-6.2 Maintain the oil level as prescribed by the manufacturer.

B-7 ELECTRICAL SYSTEM

B-7.1 Never touch concentrated electrolyte.

B-7.2 Never add concentrated electrolyte in the battery.

B-7.3 Never let the terminals of the battery to corrode.

B-7.4 Never drive the tractor, if the dynamo is not functioning.

B-7.5 Never touch bare wirings.

B-8 BEFORE, DURING AND AFTER OPERATION

B-8.1 Before starting the tractor make sure that there is no leakage of the oil and fuel and the tyres are properly inflated.

B-8.2 After starting the tractor make sure that all the instruments fitted in the panel are functioning properly.

B-8.3 Do not get on and off the tractor while it is operating.

B-8.4 While attaching a mounted implement to the tractor be careful not to get between the lower links of the hydraulic lift.

B-8.5 While adjusting the hydraulic lift and cleaning the parts do not stay on the implement.

B-8.6 Before raising or lowering the mounted implements precautions should be taken to avoid accidents.

B-8.7 Do not smoke or keep flame, near the fuel tank.

B-8.8 Always engage the clutch gently.

B-8.9 When making an emergency stop on highways or on way to or from fields, make sure that both the wheels are braked simultaneously.

B-8.10 Never ride or allow anybody to ride on the drawbar or the implement during operation.

B-8.11 Always keep the tractor in gear when going down steep slopes.

B-8.12 Always drive the tractor at a speed slow enough

to ensure safety, especially on rough ground or near ditches.

B-8.13 Be careful when working on hillside. Watch out for holes and ditches into which a wheel may drop and cause the tractor to overturn.

B-8.14 Reduce the speed before making a turn or applying the brakes.

B-8.15 During night operation keep the front lights on.

B-8.16 When the tractor is overloaded and the engine speed slows down, do not regulate the speed by repeated release of the clutch. In such cases, shift the gear to lower range or reduce the load by reducing the working depth.

B-8.17 Never toe another tractor by attaching a chain to the rear axle housing on top link or its mounting on the tractor.

B-8.18 After stopping the tractor, see that all the controls are on neutral or on off position. Shut off the fuel tank valve and take out the contact key.

B-8.19 While travelling on road during night make sure that tail light of tractor and trailer are working properly. Reflector should necessarily be provided in the rear of trailer to avoid accident.

ANNEX C

(Clause 9.2.1)

PROFORMA FOR LOG-BOOK AND SERVICING RECORD

C-1 LOG-BOOK

a) Daily record;

Date	Odometer/ Hour Recorder Reading	Actual Work- ing Hours	Idling Walk- ing Hours	Total Engine Working Hours	Opera- tions Per- formed	Area Covered	Fuel Consumed in Litres	Engine Oil consumed in Litres	Other Lubricants Consumed in Litres	Signature of the Operator	Re- marks
	<div style="display: inline-block; width: 50px; text-align: center;">On Off</div>										
(1)	(2) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)

- b) Fuel in the fuel tank on start of the month, in litres;
- c) Fuel in the fuel tank on close of the month, in litres;
- d) Total fuel issued during the month, in litres;
- e) Total fuel consumed during the month, in litres;
- f) Total engine working hours during the month; and
- g) Average fuel consumption, in litres/hour.

C-2 SERVICING RECORD

- a) Name of the service station;
- b) Date of servicing;
- c) Odometer or hour recorder reading at the time of servicing;
- d) Expected date for next service;
- e) Total kilometres or engine working hours since the last service;
- f) Nature of job performed during servicing; and
- g) Charges paid.

Signature of the
owner of the tractor

Signature of the owner
of the service station with seal

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